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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/716,610

11/20/2003

Yusuke Konno

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EXAMINER

AKHAVANNIK, HADI

ART UNIT

PAPER NUMBER

2624

NOTIFICATION DATE

DELIVERY MODE

10/19/2007

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

**Office Action Summary**

Application No.

10/716,610

Applicant(s)

KONNO ET AL.

Examiner

Hadi Akhavannik

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,7-10,15,17 and 18 is/are rejected.
- 7) ☒ Claim(s) 3-6, 8, 11-14, 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### ***Response to Arguments***

Applicant's arguments, see pages 6-10, filed 8/1/07, with respect to the rejection(s) of claim(s) 1 and 9 under Collet-Beillon, Sepai, and Wagner have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in further view of King et al. (6118524).

The Applicant has amended the independent claims to include "to form a ring-shaped annular pattern". The Examiner agrees that the prior art does not teach this feature. However after further search, King et al. (6118524) discloses this feature in column 9 line 66 to column 10 line 13. The Examiner is incorporating this reference into the previous rejection. King et al. also discloses the features of new claims 16 and 17.

### **DETAILED ACTION**

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-2, 7, 9-10, and 15, 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Collet-Beillon (5574801) in view of Sepai et al. (5455870, referred to as "Sepai" herein) in view of Wagner et al. (paper titled "Evaluation of three template matching algorithms for registering images of the eye", referred to as "Wagner" herein) in further view of King et al. (6118524, referred to as "King" herein).

Regarding claim 1, Collet-Beillon discloses a method for inspecting a bump electrode comprising the steps of: illuminating a substrate in an oblique direction where balls are arrayed by using an annular type illumination device (see figures 8-9 and column 4 line 60 to column 5 line 5 as it discloses illuminating a ball grid array at an angle) ;

photographing the substrate from above the substrate (figure 8 item 40 discloses a camera that is located above the substrate) ;

Collet-Beillon does not disclose correcting for luminance, although he does disclose a calibration step.

Sepai discloses correcting a gradation of the photographed image of an annular pattern by using a function with a saturation characteristic (see figure 8A, item 114 and column 11 line 45 to column 12 line 52 as it discloses correcting an image);

It would have been obvious at the time of the invention to one of ordinary skill in the art to include in Collet-Beillon a luminance correction means as taught by Sepai. The reason for the combination is because it makes for a more robust system can improve image quality by removing erroneous data through thresholding.

Neither Collet-Bellon nor Sepai disclose segmenting and pattern matching by using normalized correlation coefficient.

Wagner discloses making a segmented image which includes an object of interest (see section II and figure 1. In figure 1 he discloses selecting a search area S. This acts as the segmented image because the system only searches that segmented area);

and determining whether each bump electrode (in this case it is the object of interest or eyes) is an acceptable product or not by pattern matching by calculating a normalized correlation coefficient between the segmented image and a template image prepared in advance (section III titled "similarity measures" and figure 1 disclose using a template and normalized search coefficients to calculate the similarity).

It would have been obvious at the time of the invention to one of ordinary skill in the art to include in Collet-Bellon and Sepai a template matching means as taught by Wagner. The reason for the combination is because it allows for a popular and straight forward way for one to match templates (see motivation by Wagner in section III).

None of the previous references disclose that the illumination source forms ring shaped annular patterns.

King discloses this feature in column 9 line 66 to column 10 line 13.

It would have been obvious at the time of the invention to one of ordinary skill in the art to include in Collet-Bellon, Sepai, and Wagner a ring pattern illumination forming means as taught by King. The reason for the combination is because it makes for a more robust system that is able to quickly check for ring pattern when inspecting ball grid arrays.

Regarding claim 2, Sepai discloses using luminance values in the rejection of claim 1 and section III of Wagner discloses using gray level values for template matching. Sepai also discloses using math, such as thresholding, to remove bad data.

Regarding claim 7, figure of Wagner discloses all aspects of claim 7 as it shows using one template.

Regarding claims 9-10 and 15. These are the apparatus claims of 1-2 and 7 and the rejection of claims 1-2 and 7 disclose all aspects of claims 9-10 and 15.

Regarding claims 17-18, King discloses that the patterns may not be fully circular due to darkness (column 12 lines 4-48 discloses using shape fitting means to find the annular pattern because some areas may not be properly illuminated.)

***Allowable Subject Matter***

2. Claims 3-6, 8, 11-14, and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 3-4, 8, 11-12 and 16 are allowable because they disclose finding the size of the bump electrode by using templates.

Claims 5-6, and 13-14 are allowable because of their equations.

***Conclusion***

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bishop (4893346) discloses inspecting means that looks for specific shapes.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hadi Akhavannik whose telephone number is 571-272-8622. The examiner can normally be reached on 10:30-7:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian P. Werner can be reached on 517-272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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BRIAN WERNER  
SUPERVISORY PATENT EXAMINER